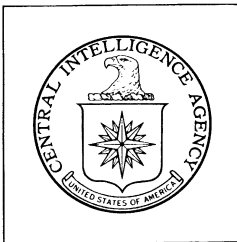


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DIRECTORATE OF
INTELLIGENCE

Imagery Analysis Report

Karamai Oilfield and Refineries
China

Declass Review by NIMA/DOD

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KARAMAI OILFIELD AND REFINERIES, CHINA

SUMMARY

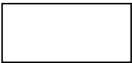
The Karamai Oilfield and Refineries have undergone considerable expansion during the past five years and now appear to be one of China's major producers of petroleum. Two refineries, a pipeline terminal and shipping facility, four crude oil storage tank farms, and field processing facilities, constructed since [redacted] were identified and discussed in this study. Analysis of photography up to and including [redacted] shows continuing expansion and production activity at both the oilfield and refineries.

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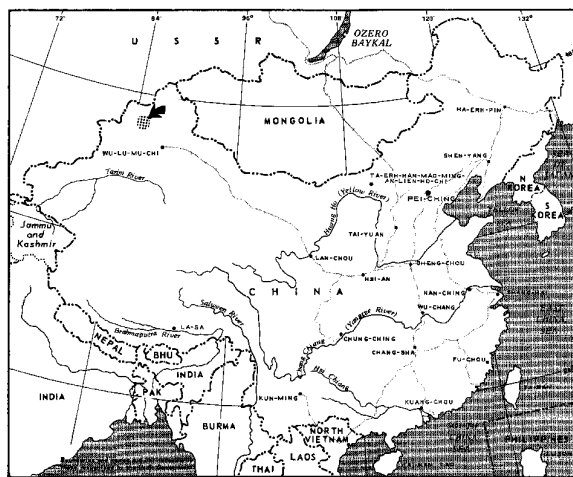


FIGURE 1. LOCATION MAP, KARAMAI OILFIELD AND REFINERIES, CHINA

INTRODUCTION

The Karamai (Ko-lo-ma-i) Oilfield (45-35N 85-03E) is located approximately 100 nautical miles (nm) north of the Tu-shan-tzu Refinery, near Wu-su in Sinkiang Province, China (Figure 1). The oilfield covers approximately 90,000 acres and has more than 825 wells. Two refineries and a pipeline terminal are located near the center of the field and about 2.5 nm east of the town of Karamai. A pipeline transmission system containing two separate and parallel pipelines carries primarily distilled petroleum from this field to the Tu-shan-tzu Refinery. The Karamai complex is served by a well-maintained, all-weather road and a graded-earth airstrip.

The purpose of this study is to identify the facilities in the oilfield and the refineries and to determine the crude oil, intermediate, and products storage capacities.

Measurements were made by the NPIC/Technical Intelligence Division with the exception of those marked with an asterisk (*) which were made by CIA/IAS. Estimated accuracy of the NPIC/TID measurements is within ± 5 feet or ± 5 per cent, whichever is greater.

GENERAL FIELD DESCRIPTION

The Karamai Oilfield can presently be divided into three separate production areas or pools (Figure 2). The original or older field consisted of two areas, Pool A and Pool B, in which development was begun in early 1956. 2/ The larger part of the older field, Pool A, is located 30 nm northeast of the refinery area and contains at least 35 wells scattered over a 51,000 acre tract. Pool B is located 11 nm southwest of the refineries and covers approximately 6,800 acres. A total of 19 wells were counted in this area.

Development in the newer portion of the field, Pool C, was started in 1961, and the area was greatly expanded between 1963 and 1965. The production area is located north and east of and is contiguous to the refinery areas and covers approximately 35,000 acres. At least 775 wells have been completed in this pool and development is continuing on the southwest edge of the area. Figure 3 shows one of the three probable drilling rigs in operation in Pool C. Drilling in the developed portion of the newer pool at Karamai Oilfield has been done on an approximately 20-acre spacing as illustrated in Figure 4.

FIELD PROCESSING AND STORAGE FACILITIES

A possible stabilization unit is located south of the cluster of support buildings near the center of Pool A. A second possible stabilization unit is located approximately 0.5 nm east of the pipeline pumping station at the southern end of Pool B (Figure 2). No other field processing facilities or gathering and storage tank farms were noted in the older sections of the oilfield.

The newer production area, Pool C, appears to have been developed in a more up-to-date and orderly manner than the older pools. Regularity of well spacing and production facilities within the area are indicative of a modern concept of oilfield exploitation. The use of the possible central jack systems for pumping wells (Figures 5a and 5b) is feasible because of the regular and relatively dense well spacing. This type of production facility would also be indicative of relatively shallow producing horizons.

Figure 6 shows one of the five small pumping stations/crude oil collecting points located in the Pool C area. Characteristically, each of these facilities consists of two or three small, cylindrical tanks (10-foot diameter [redacted] height), a pumphouse and a waste pond.

Seven gathering system tank farms are located from 1 nm west to 2 nm north-east of the refinery area. Figure 7 shows one of these storage areas with its characteristic two to six semiburied tanks and six to ten support buildings. One of these sites differs in that it contains two cylindrical storage tanks above ground rather than the semiburied type; another site differs in that it contains a semiburied, rectangular storage reservoir under construction in addition to the semiburied tanks. The dimensions of the reservoir under construction are [redacted]. Table I summarizes the measurable dimensions and capacities of the storage tanks in the gathering systems.

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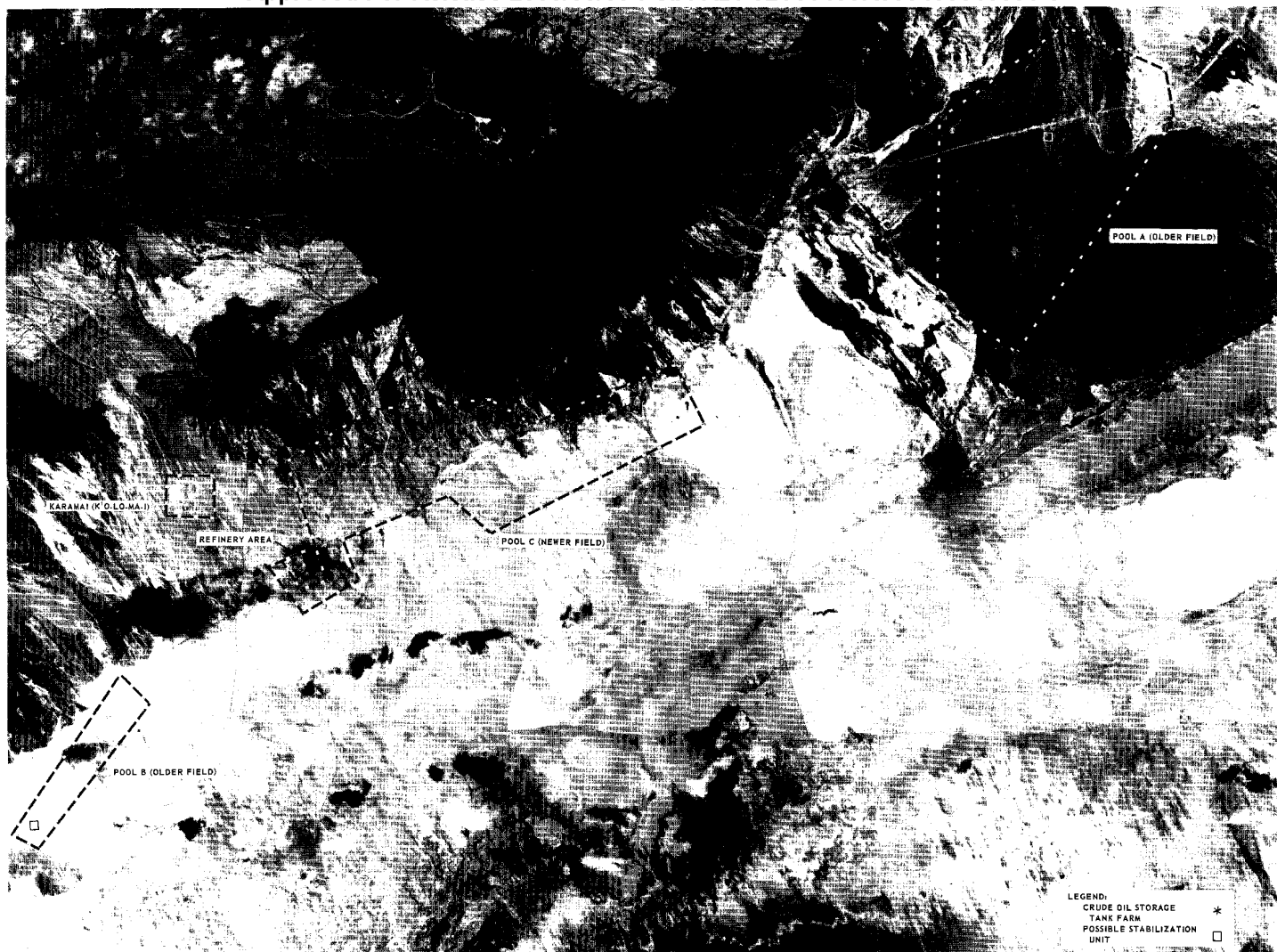
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FIGURE 3. PROBABLE DRILLING RIG

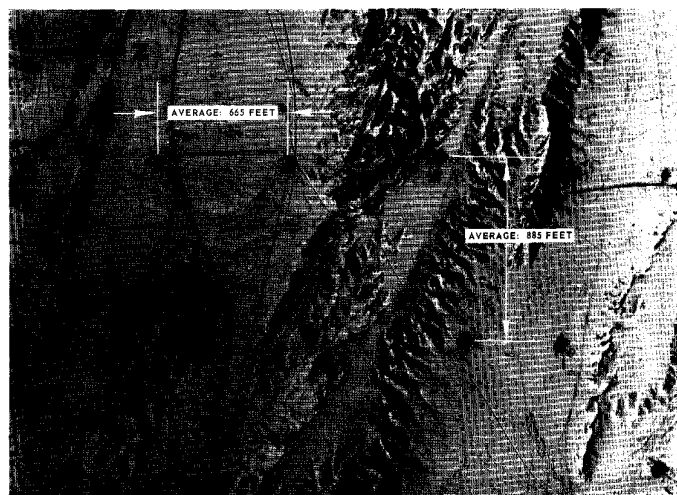


FIGURE 4. WELL SPACING IN POOL C

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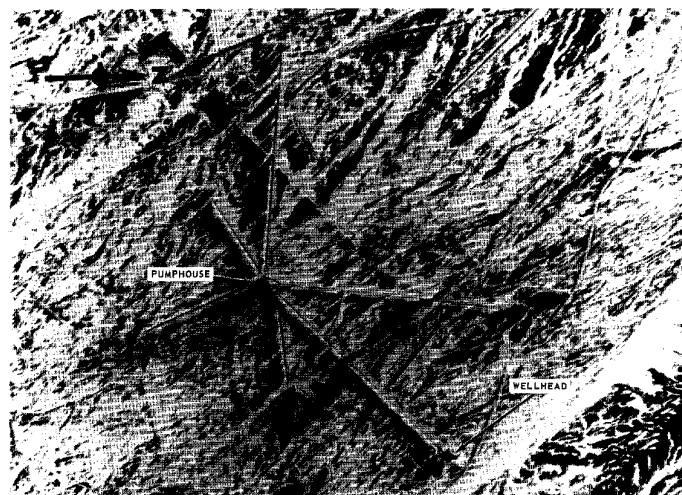


FIGURE 5A. POSSIBLE CENTRAL JACK SYSTEM,

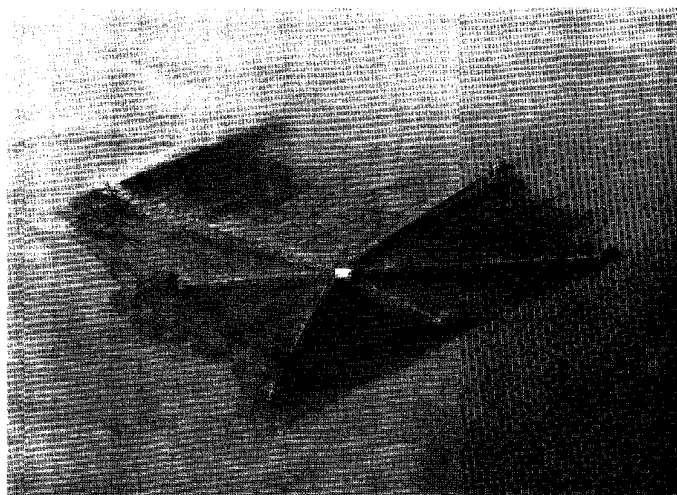


FIGURE 5B. CENTRAL JACK SYSTEM, PERSPECTIVE DRAWING

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FIGURE 6. PUMPING STATION/COLLECTION POINT.

TABLE I
DIMENSIONS AND CAPACITIES OF GATHERING TANKS

| Dimensions (feet)* diam. height | Number and Type of Tanks | Total Capacity (metric tons) |
|------------------------------------|-----------------------------|---------------------------------|
| | | |
| | 11-semiburied | Undetermined |
| | 3-semiburied | Undetermined |
| | 2-semiburied | Undetermined |
| | 1-cylindrical | 575 |
| | 1-cylindrical | 850 |

Note: * IAS measurements

Crude oil from the various small field storage and processing elements is moved into large crude oil storage tank farms for further shipment out of the area or into the nearby refineries for primary distillation. The four crude oil storage tank farms located in the Karamai oilfield complex are shown in Figures 8a, b, c, and d, and the total storage capacities of the separate tank farms is presented in Table II.

TABLE II

DIMENSIONS AND CAPACITIES OF
CRUDE OIL STORAGE TANK FARMS

| Tank Farm | Type of Storage | Number of Tanks | Total Unit Capacity (metric tons) |
|-----------|----------------------|-----------------|-----------------------------------|
| 1 | Vertical tank | 5 | 2,875 |
| | Vertical tank | 2 | 392 |
| | Vertical tank | 1 | 120 |
| | | | 3,387 |
| 2 | Vertical tank | 2 | 712 |
| | Vertical tank | 3 | 800 |
| | Semiburied Reservoir | 8 | 30,240 |
| | Semiburied Reservoir | 6 | 36,700 |
| | | | 68,452 |
| 3 | Semiburied Reservoir | 2 | 6,260 |
| | Semiburied Tank | 3 | - |
| | | | 6,260 |
| 4 | Semiburied Reservoir | 8 | 30,240 |
| | Semiburied Reservoir | 2 | 12,250 |
| | | | 42,490 |

Note: * IAS measurements

** Estimated heights based on NPIC/TID measurement of semiburied reservoir under construction at the pipeline terminal (Figure 12).

FIGURE 7. GATHERING TANKS AND SUPPORT FACILITIES.

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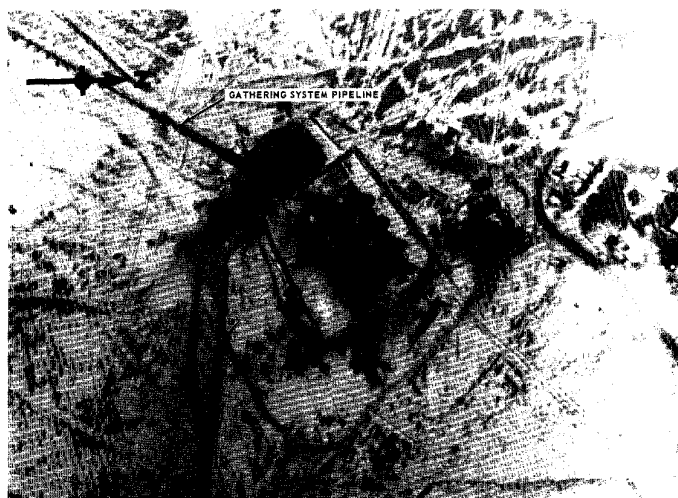


FIGURE 8A. CRUDE OIL STORAGE, TANK FARM #1, [REDACTED]

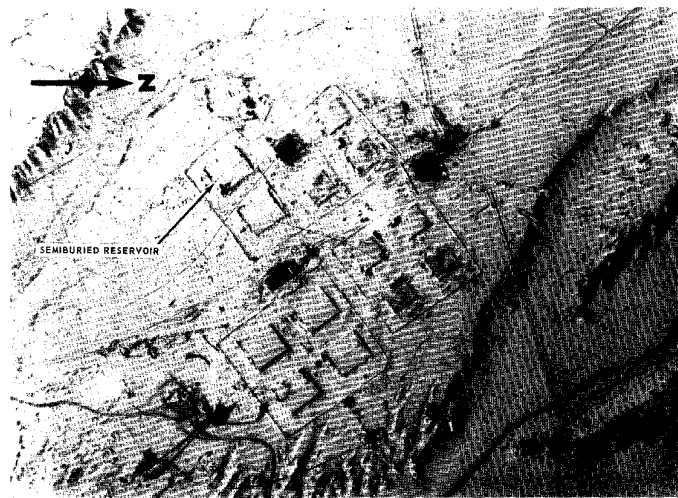


FIGURE 8B. CRUDE OIL STORAGE, TANK FARM #2, [REDACTED]



FIGURE 8C. CRUDE OIL STORAGE, TANK FARM #3, [REDACTED]

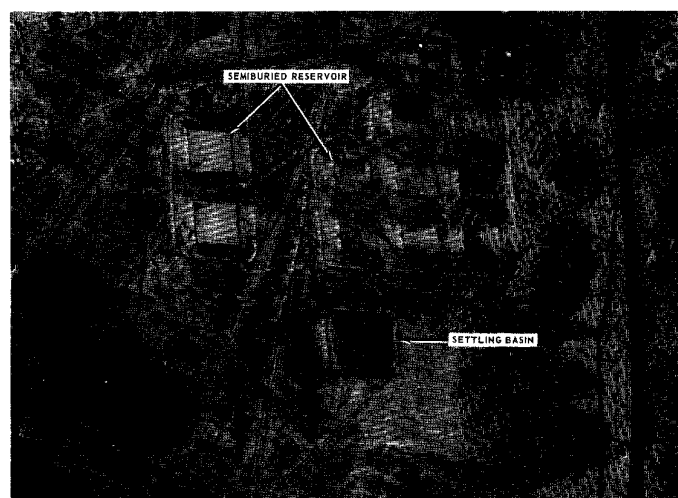


FIGURE 8D. CRUDE OIL STORAGE, TANK FARM #4, [REDACTED]

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TABLE III
STORAGE TANKS SERVING THE REFINERY COMPLEX

| Area | Annotation (See Figure 9) | Probable Type of Storage | Number of Tanks | Dimensions (feet) (diam.) (ht.) | Total Capacity of Tank Batteries (metric tons) |
|---|------------------------------|--|--------------------|---------------------------------------|---|
| Pipeline Terminal | a | Products | 4 | | 15,600 |
| | b | Products (semiburied reservoir U/C) | 1 | | 3,130 |
| Refinery 1 | c | Products | 4 | | 2,780 |
| | d | Products | 1 | | 900 |
| | e | Crude Oil | 2 | | 294 685 |
| Transport Truck Loading Facility | f | Products | 3 | | 2,100 |
| | | | 3 | | 1,160 |
| Vehicle Maintenance/ Repair Facility | g | Products | 6 | | 1,275 |
| U/I Processing Area | h | Crude Oil | 1 | | 4,150 |
| | i | Crude Oil | 2 | | Undetermined |
| | j | Intermediate | 4 | | 1,545 |
| | k | Products | 2 | | 614 |
| Refinery 2 | | | 1 | | 1,060 |
| | l | Crude Oil | 6 | | Undetermined |
| | | | 2 | | 2,780 |
| | m | Intermediate | 9 | | 1,215 |
| | | | 4 | | 945 |
| | | | 1 | | 40 |
| | n | Products | 4 | | 415 |
| | | | 2 | | 385 |
| | o | Products | 6 | | 2,040 |
| | | | 3 | | 900 |
| | | | 2 | | 370 |
| | | | 1 | | 675 |

Note: * - Tank may be partially buried. Capacity estimates based on above ground surface heights.
** - Mounded earth around tanks precludes height determinations.
*** - Close spacing of tanks precludes height determinations. Capacity estimates based on standard tank capacity charts.

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FIGURE 10. REFINERY #1

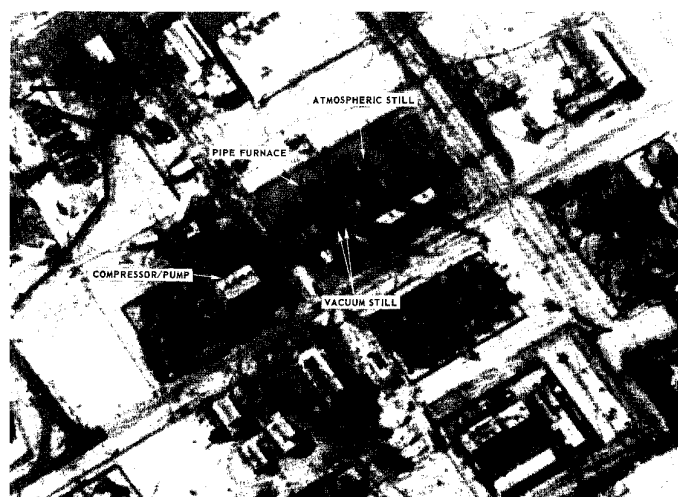


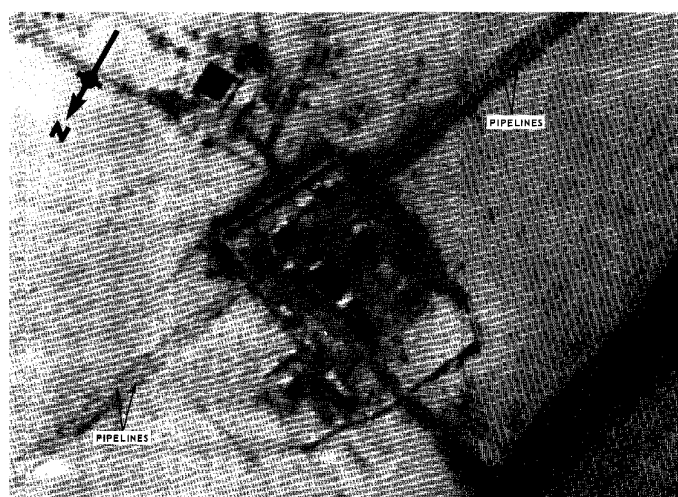
FIGURE 11. REFINERY #2

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FIGURE 12. PIPELINE TERMINAL



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REFINING FACILITIES

Refineries 1 and 2 are one nm apart (Figure 9). Equipment at both refineries indicates that only primary distillation processes are being performed at Karamai. Refinery 1 (Figures 9 and 10) consists of a series of four shell stills with one furnace, storage tanks (annotated c through e, Figure 9), and a small steam plant. Shell stills are generally considered to be of earlier design and usage than pipestills, such as those located in Refinery 2; the storage capacity of the associated tank batteries is considerably less than that of the other refinery. Therefore, it appears that this installation is somewhat older than Refinery 2. Figure 11 shows the newer refinery and Table IV enumerates the associated distillation equipment.

LEVEL OF ACTIVITY

The newer section of the field, Pool C, appears to be expanding to the southwest of the refinery area with two of the three probable drilling rigs located as "step-outs" in that direction. Construction activity west of Refinery 2 indicates an expansion in refining facilities.

From photography, it is not possible to accurately estimate the level of production activity at the complex; however, production is probably high. The shells stills at Refinery 1 were emitting smoke, and steam was coming from the unidentified processing buildings on several coverages. However, no atmospheric emissions were observed from the steam plant or pipe furnaces at Refinery 2.

TABLE IV
REFINERY 2 EQUIPMENT

| Quantity | Remarks |
|----------|-----------------------------------|
| 1 | Pipe furnace with stack |
| 1 | Atmospheric still - 110 Feet high |
| 2 | Vacuum stills - 75 feet high |
| 1 | Compressor/pump building |

Note: Diameters of the stills could not be determined.

Table III presents storage tank data of the various tank batteries which serve the refinery area. Crude Oil Storage Tank Farm 4 is excluded from this table because the information concerning this storage facility is presented in Table II. The tank battery designators in Table III are keyed to Figure 9.

REFERENCES

Maps and Charts

ACIO. USAF Operational Navigation Chart, Sheet ONC-P-7, Scale 1:1,000,000, 1st Classified Edition, January 1960 (UNCLASSIFIED)

Documents

- CIA/PID/IB 140/63, Petroleum Refinery Tu-shan-tzu and Karamai Oilfield in Communist China, 12 July 1963 (TOP SECRET
- Dept. of State, IR 7347, The Karamai Oilfield of Sinkiang, 5 October 1956 (Official Use Only)

SUPPORT FACILITIES

Support facilities for the complex (Figure 9) include an administration/support area, a housing area, a truck loading facility, a pipeline terminal, a probable vehicle maintenance and repair facility, a crude oil storage tank farm mentioned earlier in this report, and an unidentified processing area. This unidentified processing area is located immediately west of Refinery 2, and at present appears to be under construction and expanding to the south-east. Two stacks, respectively, were noted in this area.

The primary refined petroleum is moved from the refineries to the pipeline terminal and transport truck loading facility (Figure 9) from which the bulk of the oil is then shipped to the Tu-shan-tzu Refinery for further processing. The pipeline terminal facilities are illustrated in Figure 12, and the nearest pipeline pumping station, which is located about 13 nm southwest of the refinery area, is shown in Figure 13. Storage capacity at the pipeline terminal is presently being expanded by the construction of a semiburied reservoir.

Requirement

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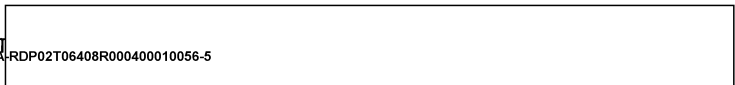
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